

Student: _____
Date: _____
Time: _____

Instructor: Dave Medd
Course: Math 269 - Fall 2010
Book: Triola/Goodman/Law/LaBute:
Elementary Statistics, 3ce

Assignment: Homework 2 - Central
Tendency

1. A simple random sample of pages from a particular dictionary was obtained. Listed below are the numbers of words defined on those pages. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data. Given that this dictionary has 1,474 pages with defined words, estimate the total number of defined words in the dictionary. Is that estimate likely to be an accurate estimate of the number of words in the English language?

53 67 37 44 34 60 72 38 56 80

a. The mean is words per page.

(Type an integer or a decimal.)

b. The median is words per page.

(Type an integer or a decimal.)

c. Select the correct choice below and fill in any answer boxes in your choice.

☐ A. The mode is words per page.

(Use a comma to separate answers as needed.)

☐ B. There is no mode.

d. The midrange is words per page.

(Type an integer or a decimal.)

The estimated number of words in the dictionary is .

(Round to the nearest whole number as needed.)

Is the estimate likely to be an accurate estimate of the number of words in the English language?

☐ A. Yes, because the mean is a relatively reliable and more consistent measure of center

☐ B. No, because the mean is based on a small sample that has large variations among its values

☐ C. No, because the mean is not sensitive to extreme variations in sample values

☐ D. Yes, because the mean is relatively reliable even with small samples

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2. An insurance institute conducted tests with crashes of new cars traveling at 6 mi/h. The total cost of the damages was found for a simple random sample of the tested cars and listed below. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data. Do the different measures of center differ very much?

\$7,526 \$5,008 \$9,140 \$6,421 \$4,282

a. The mean is \$.

(Type an integer or a decimal.)

b. The median is \$.

(Type an integer or a decimal.)

c. Select the correct choice below and fill in any answer boxes in your choice.

☐ A. The mode is \$.

(Use a comma to separate answers as needed.)

☐ B. There is no mode.

d. The midrange is \$.

(Type an integer or a decimal.)

Do the different measures of center differ very much?

☐ A. The different measures of center do not differ by very large amounts.

☐ B. There is a very large difference between the three measures.

☐ C. The median and mean differ by a very large amount.

☐ D. Only the mean is different by a large amount.

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3. Listed below are the top 10 annual salaries (in millions of dollars) of TV personalities. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data in millions of dollars. Given that these are the top 10 salaries, do we know anything about the salaries of TV personalities in general? Are such top 10 lists valuable for gaining insight into the larger population?

37.9 36.8 35.8 27.2 15.5 12.3 12.4 10.8 8.8 9.2

a. The mean is .

(Type an integer or a decimal.)

b. The median is .

(Type an integer or a decimal.)

c. Select the correct choice below and fill in any answer boxes in your choice.

☐ A. The mode is .

(Use a comma to separate answers as needed.)

☐ B. There is no mode.

d. The midrange is .

(Type an integer or a decimal.)

Given that these are the top 10 salaries, do we know anything about the salaries of TV personalities in general?

- ☐ A. Since the mean, median, and midrange are relatively reliable even with small samples, a lot of information is given on the salaries of TV personalities in general.
- ☐ B. Since the sample values give information about one segment of the salaries of TV personalities, they give a lot of information about the salaries of TV personalities in general.
- ☐ C. Since the mean, median, and midrange are based on a small sample, no information is given on the salaries of TV personalities in general.
- ☐ D. Since the sample values are the 10 highest, they give almost no information about the salaries of TV personalities in general.

Are such top 10 lists valuable for gaining insight into the larger population?

- ☐ A. Yes, because such top 10 lists give partial information about the population
- ☐ B. No, because the mean, median, and midrange are based on a small sample
- ☐ C. Yes, because the mean, median, and midrange are relatively reliable even with small samples
- ☐ D. No, because such top 10 lists represent an extreme subset of the population rather than the larger population

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4. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data.

An experiment was conducted to determine whether a deficiency of carbon dioxide in the soil affects the phenotype of peas. Listed below are the phenotype codes where 1 = smooth-yellow, 2 = smooth-green, 3 = wrinkled-yellow, and 4 = wrinkled-green. Do the results make sense?

2 2 1 4 4 2 1 3 4 2 4 4 1 4

(a) The mean phenotype code is .

(Round to the nearest tenth as needed.)

(b) The median phenotype code is .

(Type an integer or a decimal.)

(c) Select the correct choice below and fill in any answer boxes within your choice.

☐ A. The mode phenotype code is .

(Use a comma to separate answers as needed.)

☐ B. There is no mode.

(d) The midrange of the phenotype codes is .

(Type an integer or a decimal.)

Do the measures of center make sense?

☐ A. Only the mode makes sense since the data is nominal.

☐ B. All the measures of center make sense since the data is numerical.

☐ C. Only the mean, median, and mode make sense since the data is numerical.

☐ D. Only the mean, median, and midrange make sense since the data is nominal.

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5. Statistics are sometimes used to compare or identify authors of different works. The lengths of the first 10 words in a book by Terry are listed with the first 10 words in a book by David. Find the mean, median and midrange for each of the two samples, then compare the two sets of results.

Terry:	5	10	2	2	3	2	8	4	2	3
David:	3	3	2	3	3	4	3	1	1	2

The mean number of letters per word in Terry's book is .

The median number of letters per word in Terry's book is .

The midrange number of letters per word in Terry's book is .

The mean number of letters per word in David's book is .

The median number of letters per word in David's book is .

The midrange number of letters per word in David's book is .

Compare the two sets of results. Does there appear to be a difference?

- ☐ A. No. Based on the results, words in Terry's book are the same length as the words in David's book.
- ☐ B. Yes. Based on the results, words in Terry's book are longer than the words in David's book.
- ☐ C. Yes. Based on the results, words in Terry's book are shorter than the words in David's book.

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6. Listed below are the errors between the predicted temperatures and actual temperatures of a certain city. Find the mean, median and midrange for each of the two samples. Do the means and medians indicate that the temperatures predicted one day in advance are more accurate than those predicted 5 days in advance, as we might expect?

(actual high) – (predicted high 1 day earlier)	-3	2	1	-1	-1	1	1	1	1	2
(actual high) – (predicted high 5 days earlier)	0	0	-6	4	2	0	-3	2	0	-4

The mean difference between actual high and the predicted high one day earlier is

°.

(Type an integer or decimal rounded to the nearest tenth as needed.)

The median difference between actual high and the predicted high one day earlier is

°.

(Type an integer or decimal rounded to the nearest tenth as needed.)

The midrange difference between actual high and the predicted high one day earlier is

°.

(Type an integer or decimal rounded to the nearest tenth as needed.)

The mean difference between actual high and the predicted high five days earlier is

°.

(Type an integer or decimal rounded to the nearest tenth as needed.)

The median difference between actual high and the predicted high five days earlier is

°.

(Type an integer or decimal rounded to the nearest tenth as needed.)

The midrange difference between actual high and the predicted high five days earlier is

°.

(Type an integer or decimal rounded to the nearest tenth as needed.)

Do the means and medians indicate that the temperatures predicted one day in advance are more accurate than those predicted 5 days in advance, as we might expect?

- ☐ A. Yes, the means and medians indicate that predictions made one day in advance are more accurate.
- ☐ B. No, the means and medians indicate that predictions made five days in advance are more accurate.
- ☐ C. No, the means and medians do not indicate any substantial difference in accuracy.

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7. Pennies made before 1983 are 97% copper and 3% zinc, whereas pennies made after 1983 are 3% copper and 97% zinc. Listed below are the weights (in grams) of pennies from each of the two time periods. Find the mean, median and midrange weights for each of the two samples, then compare the two sets of results.

Before 1983:	3.1038	3.1088	3.1584	3.1275	3.1046	3.0772
After 1983:	2.4846	2.4994	2.4821	2.4904	2.5021	2.4958

The mean weight of the pennies made before 1983 is grams.

(Round to four decimal places as needed.)

The median weight of the pennies made before 1983 is grams.

(Type an exact answer.)

The midrange weight of the pennies made before 1983 is grams.

(Round to four decimal places as needed.)

The mean weight of the pennies made after 1983 is grams.

(Round to four decimal places as needed.)

The median weight of the pennies made after 1983 is grams.

(Type an exact answer.)

The midrange weight of the pennies made after 1983 is grams.

(Round to four decimal places as needed.)

Does there appear to be a considerable difference in the means?

- ☐ A. No, because the difference in the means is more than 5%.
- ☐ B. No, because the difference in the means is less than 5%.
- ☐ C. Yes, because the difference in the means is more than 5%.
- ☐ D. Yes, because the difference in the means is less than 5%.

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8. Waiting times (in minutes) of customers in a bank where all customers enter a single waiting line and a bank where customers wait in individual lines at three different teller windows are listed below. Find the mean, median and midrange for each of the two samples, then compare the two sets of results.

Single Line	6.3	6.5	6.7	6.8	7.0	7.3	7.5	7.6	7.6	7.6
Individual Lines	4.2	5.3	6.0	6.3	6.8	7.5	7.8	8.3	9.0	9.7

The mean waiting time for customers in a single line is minutes.

The median waiting time for customers in a single line is minutes.

The midrange waiting time for customers in a single lines is minutes.

The mean waiting time for customers in individual lines is minutes.

The median waiting time for customers in individual lines is minutes.

The midrange waiting time for customers in individual lines is minutes.

Determine whether there is a difference between the two data sets that is not apparent from a comparison of the measures of center. If so, what is it?

- ☐ A. The times for customers in individual lines are much more varied.
- ☐ B. The times for customers in a single line are much more varied.
- ☐ C. There is no difference between the two data sets.

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9. Listed below are the durations (in hours) of a simple random sample of all flights of a space shuttle. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data. Is there a duration time that is very unusual? How might that duration time be explained?

75 91 230 194 167 257 193 372 258 230 381 331 221 240 0

a. The mean is hours.

(Round to one decimal place as needed.)

b. The median is hours.

(Round to one decimal place as needed.)

c. Select the correct choice below and fill in any answer boxes in your choice.

☐ A. The mode is hours.

(Use a comma to separate answers as needed. Round to one decimal place as needed.)

☐ B. There is no mode.

d. The midrange is hours.

(Round to one decimal place as needed.)

Is there a duration time that is very unusual? How might that duration time be explained?

☐ A. Yes, the time of more than 375 hours is very unusual. It could represent a very long flight.

☐ B. No, there is no flight with an unusual duration time.

☐ C. No, the flights have usual duration times ranging from 0 to over 375 hours.

☐ D. Yes, the time of 0 hours is very unusual. It could represent a flight that was aborted.

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10. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data.

Listed below are the amounts of personal income (in dollars) for five states.

\$25,108 \$26,143 \$23,532 \$32,171 \$32,966

(a) The mean per capita income is \$.
(Round to the nearest dollar as needed.)

(b) The median per capita income is \$.
(Round to the nearest dollar as needed.)

(c) Select the correct choice below and fill in any answer boxes within your choice.

☐ A. The mode per capita income is \$.
(Use a comma to separate answers as needed.)

☐ B. There is no mode.

(d) The midrange of the data set is \$.
(Round to the nearest dollar as needed.)

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11. Listed below are the playing times (in seconds) of songs that were popular at the time of this writing. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data. Is there one time that is very different from the others?

453 242 236 247 247 296 283 222 243 211 258 239 211 257 255 261

a. The mean is seconds.

(Round to one decimal place as needed.)

b. The median is seconds.

(Round to one decimal place as needed.)

c. Select the correct choice below and fill in any answer boxes in your choice.

☐ A. The mode is seconds.

(Use a comma to separate answers as needed. Round to one decimal place as needed.)

☐ B. There is no mode.

d. The midrange is seconds.

(Round to one decimal place as needed.)

Is there one time that is very different from the others?

☐ A. No; all the times are not very different from each other.

☐ B. Yes; the time of 453 seconds is very different from the others.

☐ C. Yes; the time of 296 seconds is very different from the others.

☐ D. Yes; the time of 211 seconds is very different from the others.

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12. Find the (a) mean, (b) median, (c) mode, and (d) midrange for the given sample data.

Fourteen different second-year medical students measured the blood pressure of the same person. The systolic readings (in mmHg) are listed below.

142 128 120 120 125 128 128 143 148 128 144 136 139 142

(a) The mean blood pressure reading is mmHg.

(Round to the nearest tenth as needed.)

(b) The median blood pressure reading is mmHg.

(Round to the nearest tenth as needed.)

(c) Select the correct choice below and fill in any answer boxes within your choice.

☐ A. The mode blood pressure reading is mmHg.

(Use a comma to separate answers as needed.)

☐ B. There is no mode.

(d) The midrange of the data set is mmHg.

(Round to the nearest tenth as needed.)

13. A student earned grades of B, D, B, C, and B. Those courses had the corresponding numbers of credit hours 1, 3, 3, 1, and 3. The grading system assigns quality points to letter grades as follows: A = 4; B = 3; C = 2; D = 1; F = 0. Compute the grade point average (GPA) as a weighted mean and round the result with two decimal places. If the Dean's list requires a GPA of 3.00 or greater, did this student make the Dean's list?

The grade point average is .

(Round to two decimal places as needed.)

Did this student make the Dean's list?

☐ A. Yes because at least two of the student grades are B or above

☐ B. No because the student has at least one grade less than 3

☐ C. No because the student's GPA is less than 3.0

☐ D. No because the students GPA is not 4.0

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14. The geometric mean is often used in business and economics for finding average rates of change, average rates of growth, or average ratios. Given n values (all of which are positive), the geometric mean is the n th root of their product. The average growth factor for money compounded at annual interest rates of 11%, 4%, and 2% can be found by computing the geometric mean of 1.11, 1.04, and 1.02. Find that average growth factor. What single percentage growth rate would be the same as having three successive growth rates of 11%, 4%, and 2%? Is that result the same as the mean of 11%, 4%, and 2%?

The average growth factor is .

(Round to four decimal places as needed.)

The single percentage growth rate that would be the same as having three successive growth rates of 11%, 4%, and 2% is %.

(Round to two decimal places as needed.)

The mean of 11%, 4%, and 2% is %.

(Round to two decimal places as needed.)

The single percentage growth rate the same as the mean of 11%, 4%, and 2%.

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15. Because the mean is very sensitive to extreme values, it is not a resistant measure of center. The trimmed mean is more resistant. To find the 10% trimmed mean for a data set, first arrange the data in order, then delete the bottom 10% of the values and the top 10% of the values, then calculate the mean of the remaining values. For the following credit-rating scores, find (a) the mean, (b) the 10% trimmed mean, and (c) the 20% trimmed mean. How do the results compare?

713	716	785	806	795
793	707	676	772	616
693	832	769	529	657
558	740	793	700	755

a. The mean is .
(Round to one decimal place as needed.)

b. The 10% trimmed mean is .
(Round to one decimal place as needed.)

c. The 20% trimmed mean is .
(Round to one decimal place as needed.)

How do the results compare?

- ☐ A. The distribution of the data appears to be skewed to the right because the results appear to show a trend of decreasing values as the percentage of trim increases.
- ☐ B. There is zero skew in the distribution of the data because the results are not dramatically different.
- ☐ C. The distribution of the data appears to be skewed to the left because the results appear to show a trend of increasing values as the percentage of trim increases.

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1. 54.1
54.5
B
57
79,743
B

2. 6,475.40
6,421.00
B
6,711.00
A

3. 20.67
13.95
B
23.35
D
D

4. 2.7
2.5
A, 4
2.5
A

5. 4.1
3
6.0
2.5
3
2.5
B

6. 0.4
1
- 0.5
- 0.5
0
- 1.0
C

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7. 3.1134
3.1067
3.1178
2.4924
2.4931
2.4921
C

8. 7.09
7.15
6.95
7.09
7.15
6.95
A

9. 216
230
A, 230
190.5
D

10. 27,984
26,143
B
28,249

11. 260.1
247
A, 211,247
332
B

12. 133.6
132
A, 128
134

13. 2.36
C

14. 1.056
5.60
5.67
is not

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15. 720.3
 730
 734.9
 C
